

**03-R-313^a, The Center for Integrated Nanotechnologies (CINT) Facility
Sandia National Laboratories, Albuquerque, New Mexico, and
Los Alamos National Laboratory, Los Alamos, New Mexico**

1. Significant Changes

There have been no significant changes to scope, cost, or schedule.

2. Design, Construction, and D&D Schedule

	(fiscal quarter)					
	Preliminary Design start	Final Design Complete	Physical Construction Start	Physical Construction Complete	D&D Offsetting Facilities Start	D&D Offsetting Facilities Complete
FY 2006...	4Q FY 2002	2Q FY 2004	1Q FY 2004	3QFY 2007	N/A	N/A
FY 2007...	4Q FY 2002	2Q FY 2004	1Q FY 2004	3Q FY 2007	N/A	N/A

3. Baseline and Validation Status

	(dollars in thousands)					
	TEC	OPC, except D&D Costs	Offsetting D&D Costs	Total Project Costs	Validated Performance Baseline	Preliminary Estimate
FY 2006...	73,800	2,000	—	75,800	75,800	N/A
FY 2007...	73,754 ^b	2,000	—	75,754 ^b	75,754	N/A

4. Project Description, Justification, and Scope

This project provides materials and services required to design and construct the proposed Center for Integrated Nanotechnologies (CINT) Facility. CINT is one of the five BES/Office of Science Nanoscale Science Research Centers (NSRCs). It will be operated jointly by Sandia National Laboratories (SNL) and Los Alamos National Laboratory (LANL). CINT is a U.S. Department of Energy (DOE) line item project that is being carried out as a partnership between SNL and LANL to design and build a world-class user facility for research in nanoscale science. The partnership between two world-class DOE laboratories, each with significant technical expertise and capability in nanoscale research, will provide the best possible facility to the nanoscience research community.

CINT will be a distributed Center that is jointly operated by SNL and LANL. Its primary objective is to develop the scientific principles that govern the performance and integration of nanoscale materials, thereby building the foundations for future nanotechnologies. The distinguishing characteristic of the Center is its focus on exploring the path from scientific discovery to the integration of nanostructures into the micro and macro worlds. This path involves experimental and theoretical exploration of behavior, understanding new performance regimes and concepts, testing designs, and integrating nanoscale materials and structures. This Center works closely with the other NSRCs to ensure that their

^a This project was submitted in the FY 2004 President's Request as project 04-R-314. In FY 2003 Congress appropriated construction funds for this project (after the FY 2004 Request was submitted to Congress) under project 03-R-313.

^b The full project TEC and TPC established at Critical Decision 2 (Approve Performance Baseline) are \$73,754,000 and \$75,754,000, respectively and include the costs for PED from project 02-SC-002. TEC and TPC are reduced by \$46,000 as a result of the FY 2006 rescission.

discoveries are evaluated in the context of integrated functional systems. This approach offers a unique role for the DOE in support of the National Nanotechnology Initiative.

The managements of the Los Alamos and Sandia National Laboratories are committed to develop CINT as a DOE national resource for the advancement of nanoscience and technology. Through its laboratory partnership, CINT will leverage expertise and facilities from both SNL and LANL and make those resources available to the user community. In order to provide a strong central focus for the user community while also providing extraordinary leverage and access to existing laboratory capabilities, the CINT project, in conjunction with its user community, has developed a unique Core/Gateway structure.

The Core Facility (approximately 95,000 gross square feet), which will be constructed in Albuquerque, will be the single point of entry for the CINT user community and will provide the multi-disciplinary research environment needed to explore scientific challenges associated with nanoscience integration. In order to assure open access to the user community, the Core Facility is being constructed on DOE property outside of the Kirtland Air Force Base (KAFB).

In addition to developing the Core Facility, the CINT user community strongly recommended that the CINT project also provide access to the deep and broad resources of both SNL and LANL. The Gateway Facilities at both SNL and LANL are designed to provide the user community with direct access to existing DOE/SC and DOE/NNSA programmatic investments at each laboratory.

The Gateway to Sandia Facility is housed within an existing space in an NNSA building located on the main campus within the KAFB. The Gateway to Sandia, which will provide office and laboratory space for CINT users, is co-located with many of Sandia's existing facilities for nanoscale science research and Sandia's world-class microfabrication facilities. No new construction is required for the Gateway to Sandia since it will utilize existing NNSA space. (While the NNSA facility that houses the Gateway to Sandia is within the KAFB boundaries, it is located outside classified restricted boundaries and is therefore open for general user access).

Development of the Gateway to Los Alamos Facility (approximately 34,000 gross square feet) involves the construction of a new building on the Los Alamos campus providing the user community direct access to existing nanoscale materials science and bioscience capabilities. The Gateway to Los Alamos Facility is located in the center of the Los Alamos materials science complex which is in an open security environment and will facilitate easy access to these existing nanoscale materials science and bioscience resources. Traditionally, materials science and bioscience have been viewed as separate activities and are housed primarily in separate parts of the Los Alamos campus. The Gateway to Los Alamos will provide a unique research environment for CINT users by combining nanoscale materials science and biosciences capabilities and expertise under one roof surrounded by supporting resources accessible to CINT users.

The CINT project is building a unified community around its Core Facility and two Gateway Facilities (one each at SNL and LANL). The CINT project is using public workshops, presentations at scientific forums, web-based communications, and one-on-one interactions with CINT scientists to help build its user community with significant participation from university, industrial, and laboratory researchers. Input and advice from the user community is used to help define and refine the proper tools and scientific focus to address the challenges of nanoscale science and technology. CINT is focused on *integration* because it is the key factor in the scientific development and application of nanoscience. The tools and resources of CINT will be available at no cost to university, industrial, and laboratory

researchers through a peer-reviewed process. The external scientific community has been and will continue to be a vital partner in developing CINT so that it is successful in achieving its vision.

The initial technical focus of the Center will be on the following five thrusts:

- Nanophotonics and Nanoelectronics
- Complex Functional Nanomaterials
- Nanomechanics
- Nanoscale and Bio-Microinterfaces
- Theory and Simulation

This laboratory and office space complex will house state-of-the-art clean rooms and equipment for nanolithography, atomic layer deposition, and materials characterization along with general purpose chemistry and electronics labs and offices for Center staff and collaborators.

The CINT Core Facility will include class 1,000 clean room space for nanofabrication and characterization equipment and class 100 clean room space for lithography activities. This facility will also require general purpose chemistry/biology laboratories, electronic and physical measurement laboratories, office and meeting room space.

The scope of this project is to construct the CINT Core and Gateway to Los Alamos. The engineering effort includes preliminary and final design of both buildings. The project also includes procurement of an initial set of experimental capital equipment and construction of facilities. FY 2003, FY 2004, and FY 2005 construction funds were used for conventional construction and equipment procurement. FY 2006 and FY 2007 construction funds will be used to continue these activities.

The project will be conducted in accordance with the project management requirements in DOE Order 413.3 and DOE Manual 413.3-1, Program and Project Management for the Acquisition of Capital Assets.

Compliance with Project Management Order

- Critical Decision-0: Approve Mission Need—3Q FY 2001
- Critical Decision-1: Approve Preliminary Baseline Range—3Q FY 2002
- Critical Decision-2: Approve Performance Baseline—4Q FY 2003
- External Independent Review Final Report—4Q FY 2003
- Critical Decision-3: Approve Start of Construction—1Q FY 2004
- Critical Decision-4a: Approve Start of Initial Operations—3Q FY 2006
- Critical Decision-4b: Approve Start of Full Operations—3Q FY 2007

5. Financial Schedule

(dollars in thousands)

	Appropriations	Obligations	Costs
Design/Construction by Fiscal Year			
Design			
2002	1,000	1,000	167
2003	3,159 ^a	3,159 ^a	3,319
2004	—	—	562
2005	—	—	111
Total, Design PED (02-SC-002)	4,159	4,159	4,159
Construction			
2003	4,444 ^b	4,444 ^b	—
2004	29,674 ^b	29,674 ^b	6,946
2005	30,650 ^{ab}	30,650 ^{ab}	40,857
2006	4,580 ^{bc}	4,580 ^{bc}	15,330
2007	247 ^b	247 ^b	6,462
Total, Construction	69,595	69,595	69,595
Total TEC	73,754	73,754	73,754

6. Details of Project Cost Estimate

Total Estimated Costs

(dollars in thousands)

	Current Estimate	Previous Estimate
Preliminary and Final Design(PED 02-SC-002).....	4,159	4,159
Construction Phase		
Site Preparation	1,430	1,430
Equipment	14,002	13,861
All other construction	48,950	45,158
Contingency	5,213	9,192
Total, Construction Costs	69,595	69,641
Total, TEC	73,754	73,800

^a PED funding was reduced \$41,000 as a result of the FY 2003 general reduction and rescission. This total reduction/rescission was restored to construction in FY 2005 to maintain the TEC and project scope.

^b Construction funding was reduced by \$56,000 as a result of the FY 2003 general reduction and rescission, by \$176,000 as a result of the FY 2004 rescission, and by \$247,000 as a result of the FY 2005 rescission. This total reduction is restored in FY 2005, FY 2006, and FY 2007 to maintain the TEC and project scope.

^c Construction funding was reduced by \$46,000 as a result of the FY 2006 rescission.

Other Project Costs

(dollars in thousands)		
	Current Estimate	Previous Estimate
Conceptual Planning	800	800
Start-up	1,200	1,200
Total, OPC	2,000	2,000

7. Schedule of Project Costs

(dollars in thousands)							
	Prior Years	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	Outyears Total
TEC (Design)	4,159	—	—	—	—	—	4,159
TEC (Construction)	63,133	6,462	—	—	—	—	69,595
OPC Other than D&D	2,000	—	—	—	—	—	2,000
Total Project Costs	69,292	6,462	—	—	—	—	75,754

8. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy (fiscal quarter)	3Q FY 2007 ^a
Expected Useful Life (number of years)	40
Expected Future start of D&D for new construction (fiscal quarter)	N/A

(Related Funding Requirements)

(dollars in thousands)				
	Annual Costs		Life Cycle Costs	
	Current estimate	Previous Estimate	Current estimate	Previous Estimate
Operations	18,000	N/A	—	N/A
Maintenance	500	N/A	—	N/A
Total Related funding	18,500	N/A	830,800	N/A

9. Required D&D Information

Not applicable. This project received construction funding starting in FY 2003. The project includes approximately 95,000 gsf of new construction at SNL and approximately 34,000 gsf of new construction at LANL, which was offset by banked excess space.

^a Fiscal quarter designated corresponds to start of full operations and completion of project. Initial operations (experimental research) with a limited suite of special equipment will begin earlier; these research costs are not part of the TPC and will be funded by the BES program.

10. Acquisition Approach

Preliminary and final design for the Core Facility was accomplished through the use of a firm fixed-price contract with a qualified and experienced A/E firm. The selection was made under the SNL Best Value Contracting Procedures. The construction contract for the Core Facility has been awarded under a fixed-price contract using the SNL Best Value Contracting Procedures.

The design and construction of the Gateway to Los Alamos Facility is being accomplished through the use of a firm fixed-price Design-Build contract with a qualified and experienced construction-A/E firm. The selection was made under the LANL Best Value Contracting Procedures using LANL developed Performance Specifications to solicit proposals from interested firms.

Procurement of the initial set of experimental capital equipment for both facilities is being carried out at SNL using standard corporate procurement processes. Fixed price contracts are awarded for the instruments after Best Value Contracting Procedures are used to select the vendors.